

REMARKS**Summary Of The Office Action**

Claims 20-38 pending.

Claims 20-31 and 36-38 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton in view of Carr et al. U.S. Patent No. 5,011,520 ("Carr"). Claims 32-35 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton and Carr in view of Wofford et al. U.S. Patent No. 5,011,520 ("Wofford").

Applicants' Reply

Applicants present a new claim 39 which further defines the invention.

Applicants' respectfully traverse the prior art rejections.

Applicants resubmit the Remarks section presented in the previous Reply dated July 28, 2005 and January 9, 2006. For brevity, the Remarks sections of the previous Replies is not reproduced verbatim in their entirety, but are incorporated by reference herein in their entirety. Applicants respectfully request reconsideration of those Remarks.

Applicants here submit the following additional remarks:

As previously submitted, applicants' invention relates to plasma processing of industrial waste gases to remove toxic byproducts in industrial processes. According to independent claim 20, a liquid jet pump (e.g. Venturi effect pump) is used to draw the waste gases through a reaction chamber for processing. A suction port of the liquid jet is connected to an outlet of the reaction chamber so that processed gases exiting the outlet of the reaction chamber are mixed

with the liquid of liquid jet. This waste cleaning system (claim 20) is not shown, taught or suggested by the cited prior art.

Applicants respectfully submit that as commonly understood in the art, liquid jet pumps (e.g., Fig. 1, pump 3) operate on the so-called Venturi effect, involve constricting fluid flow to create suction in the constricted region. The Venturi effect requires not only fluid flow (at any pressure) but also a constricted region in the flow path, which leads to a pressure drop in the constricted region. After the constricted region, for example, in a flared Venturi tube, the fluid pressure returns to its original value. The constricted region having lower pressure is connected via a suction tube or port (e.g., Fig. 1, suction port 21) to another chamber to provide vacuum drawing power or suction on the chamber.

§ 103(a) rejections

As previously submitted, Barton does not disclose or suggest a liquid jet pump to suction a reaction chamber. Barton describes three annular rows of inwardly directed spray nozzles 94 to atomize quenching liquid to form a uniform spray of micron-sized droplets to quench the product gas and particulate matter passing through spray ring 16. (See Barton col. 5 lines 15 - 30). Spray nozzles 94 are configured to atomize liquid but not to create “suction” on the reaction chamber. In fact, a person of ordinary skill in the art would read Barton as teaching away from the use of liquid jet pumps for Barton provides a mechanical pumps (e.g., induction/suction fan 20, variable speed waste feed pump 74, etc.) for moving waste gases and products (See e.g., col. 6 lines 31-37).

Accordingly claim 20 , which requires “a liquid jet pump having a suction port connected to said reaction chamber outlet and generating negative pressure in said reaction chamber,” is neither anticipated nor obvious from Barton,

Applicants respectfully submit that the Office Action misinterprets Barton. The Office Action, in particular, mistakenly states that “[T]he spray nozzles appear to constitute a liquid jet pump of the claimed invention being the fact that the liquid jet pump (94) is arranged to draw treated gasses out of said reaction chamber via variable pumps (104, 112), which pushes the mixed liquid and treated gas out of the reaction chamber or created a negative pressure in the reaction chamber.” (See Office Action, top of page 3). Applicants respectfully submit that this conclusion is incorrect. There is no description or suggestion in Barton that spray nozzles 94 are arranged as a liquid jet pump (based on the Venturi Effect) to draw treated gasses out of said reaction chamber. As noted above, spray nozzles 94 are configured to atomize liquid but not to create “suction” on the reaction chamber. (See Barton col. 5 lines 15 - 60). In fact, a person of ordinary skill in the art would read Barton as teaching away from the use of liquid jet pumps for Barton provides a mechanical pumps (e.g., induction/suction fan 20, variable speed waste feed pump 74, etc.) for moving waste gases and products. (See e.g., col. 6 lines 31-37).

Further, claim 20, which requires “a liquid jet pump having a suction port connected to said reaction chamber outlet and generating negative pressure in said reaction chamber,” is not obvious even when Barton is viewed together with Carr.

Carr, as previously noted, merely describes a hydrodynamic fume scrubber, i.e. a water scrubber. (See e.g., FIGS 1-10). Carr’s fume scrubber includes several stages (e.g., an inlet stage 18, and a negative pressure providing stage 20 which is upstream of a main chamber 22). (See e.g., col. 6 line 28 - col. 7 lines line 4, FIG. 6a, etc.). As correctly noted by the Examiner,

Carr describes “a negative pressure suction stage (20) . . . to draw the gaseous effluent into the main scrubbing chamber 22.” (See Office Action section 2 page 3 lines 5 -12, citing Carr FIG. 5 and col. 8 lines 35-43).

However, applicants have previously noted that Carr’s negative pressure providing stage is located at the inlet or upstream of the main chamber 22. Carr’s liquid jet pump mixes the intake of gasses to be treated with liquid. In contrast to applicants’ invention, Carr does not draw “draw treated gases out of said reaction chamber mixed with liquid from said liquid jet.” Carr does not show or suggest “a liquid jet pump having a suction port connected to said reaction chamber outlet and generating negative pressure in said reaction chamber.”

In this context, applicants’ again note that Carr’s apparatus configuration, which has the negative pressure providing stage located at the inlet, will be unworkable in plasma processing arrangements because of the physical and chemical nature of plasma processes. Plasma processes are “dry” gas processes and will not tolerate any mixture of water or liquids with the intake of gasses to be treated in the reaction chamber. Thus, a person of ordinary skill in the art would not apply Carr’s inlet configuration to a plasma reaction chamber to draw “dry” process gases and mix them with water before plasma treatment.

Thus, Carr like Barton does not to show, teach or suggest using a liquid jet pump located at the outlet of a plasma reaction chamber to draw waste or treated gases out of the plasma processing reaction chamber. Therefore, claim 20 is patentable over the cited references — Barton and Carr, whether they are viewed individually or in combination.

Claim 39

New claim 39 has limitations that are similar to those of claim 20. Claim 39 further clarifies the inventive arrangement of the liquid jet pump at the outlet of the reaction chamber.

The liquid jet pump is disposed so that (1) down stream: it mixes outgoing treated gases with water, and (2) upstream: it provides a “dry” low pressure environment for plasma ignition in the reaction chamber.

Claim 39 is patentable over the cited references — Barton and Carr for at least the same reasons that parent claim 20 is patentable over these references.

Dependent claims 21-38

Dependent claims 21-38 are patentable over the cited references — Barton, Carr and Wofford, for at least the same reasons that parent claim 20 is patentable over these references.

Conclusion

Applicants respectfully submit that this application is now in condition for allowance.

Reconsideration and prompt allowance of which are requested.

If there are any remaining issues to be resolved, applicant respectfully requests that the Examiner should kindly contact the undersigned attorney for a telephone interview.

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